CLAIMS

1. A method of conducting an assay with an optical disc and disc drive, the method comprising:

providing a sample of cells on a disc surface in a chamber in a disc, the chamber including at least one capture zone with a capture agent;

loading the disc into an optical reader;

rotating the optical disc;

directing an incident beam of electromagnetic radiation to the capture zone;

detecting a beam of electromagnetic radiation formed after interacting with the disc at the capture zone;

converting the detected beam into an output signal; and

analyzing the output signal to extract therefrom information relating to the number of cells captured at the capture zone.

2. The method according to claim 1, wherein the chamber with the disc surface supporting the sample is internal to the disc and is bounded on opposite sides by a substrate and cap.

3. The method according to claim 1, wherein the optical disc is constructed with a reflective layer such that light directed to the capture zone and not striking a cell is reflected.

4. The method according to claim 1, wherein the optical disc is constructed such that light directed to the capture zone and not striking a cell is transmitted through the optical disc, the disc being between the light source and the detector.

5. The method according to any one of claim 1, wherein the disc surface is coated with a first group of cell capture agents.

6. The method according to claim 5, wherein the cell capture agents define a discrete capture zone.

7. The method according to claim 6, wherein a second group of cell capture agents define a second discrete capture zones in a predetermined pattern.

8. The method according to claim 7, wherein the first and second captures zones are in one chamber.

9. The method according to claim 5, wherein the cell capture agents are for binding with cell surface antigen.

10. The method according to claim 9, wherein the cell surface antigen is selected from the CD family of antigens.

11. The method according to claim 10, wherein the cell surface antigen is selected from the group consisting of CD3, CD4, CD8, and CD45.

12. The method according to claim 1, further including:

directing the sample of cells into proximity with the cell capture agents;

incubating the cells in the presence of the capture agents; and

allowing the cells to specifically bind to the capture agents.

13. The method according to claim 12, further including analyzing the number of cells captured to thereby determine a cell concentration in the sample.

14. The method of claim 13, wherein the analyzing includes detecting sufficiently large changes in the level of light reflected from or transmitted through the disc.

15. The method of claim 13, wherein the analyzing includes using image recognition to count captured cells.

16. The method of claim 15, wherein the image recognition distinguished one type of white blood cell from another.

17. The method of claim 1, wherein the chamber has a plurality of capture zones, each having a different cell capture agent.

18. The method of claim 17, wherein the rotating includes rotating for a sufficient period of time at a sufficient speed so that the cells have an opportunity to bind with the capture molecules.

19. The method of claim 18, wherein the rotating includes rotating for a sufficient period of time at a sufficient speed so that unbound cells are moved away from the capture zones.

20. The method of claim 19, wherein the rotating is done at a single speed.

21. The method of claim 17, further comprising counting the captured cells in each of the capture zones and providing an output including the counts.

22. The method of claim 21, wherein the output includes counts for CD4 cells and CD8 cells, and a ratio of CD4 to CD8 cells.

23. An optical disc comprising:

a substrate;

a cap parallel to the substrate, a chamber defined therebetween and including capture zones; and

a capture layer over the substrate at the capture zones, such that a first capture zone has first cell capture agents and a second capture zone has a second cell capture agents.

24. The disc of claim 23, wherein the agents are antibodies for cell surface antigens on white blood cells.

25. The disc of claim 24, wherein the agents are antibodies for CD4 and CD8.

26. An optical disc and drive system for receiving a sample, the system comprising:

a disc including:

a substrate;

a cap parallel to the substrate, a chamber defined therebetween and including capture zones;

a capture layer over the substrate at the capture zones, such that a first capture zone has first cell capture agents and a second capture zone has a second cell capture agents;

a light source for directing light to the disc at the capture zones;

a detector for detecting light reflected from or transmitted through the disc at the capture zones and providing a signal; and

a processor for using the signal to count items in the sample bound to the capture molecules.

27. The disc of claim 26, wherein the detector is on the same side of the disc as the light source for detecting light reflected from the captures zones.

28. The disc of claim 26, wherein the detector is on the opposite side of the disc as the light source for detecting light transmitted through the capture zones.

29. The disc of claim 26, wherein the processor includes image recognition software for detecting imaged cells.